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ERGONOMICS FOR THE OFFICE

P89 - 7E

ERGONOMICS FOR THE OFFICE

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Canadian Centre for Occupational Health and Safety

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ERGONOMICS FOR THE OFFICE

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PREFACE

This publication is part of a series on ergonomics. It is prepared as a source of information for health and safety committees and others with an interest in understanding and reducing the occupational risks of working in offices.

ERGONOMIC INFOGRAMs, shown as Appendices A to E, are available separately for display in the workplace (Set E-D).

For more specific information on these topics, refer to the following CCOHS publications.

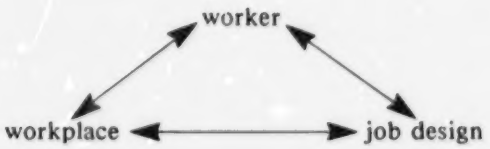
- ERGONOMIC INFOGRAMS on VDT Workplaces (Set E-B)
- Ergonomics for Workplaces with VDTs (P89-22E)
- Job Design--How it Contributes to Occupational Health and Safety (P89-4E)

1. INTRODUCTION

The office, like most other workplaces, presents potential health and safety hazards. Office workers report problems related to vision, posture, thermal conditions, noise, safety and job design.

The office workplace contains the tools, equipment and work stations required to complete a job. These components determine the worker's body position. The work environment, with its lighting, acoustics, temperature and humidity, affects comfort and health. Job design, which defines how jobs are done, affects the variety of mental and physical activities, and work/rest schedules.

The worker interacts with the workplace by making adjustments and using equipment. The worker also modifies job design to suit the individual style. The illustration below shows the three-way relation between the worker, the workplace and the job.



By applying ergonomics in the office, workers together with occupational health and safety committees can prevent many work-related health problems.

2. VISION

Office work is visually demanding. While office work is not known to cause permanent vision or eye problems, many office workers report eyestrain, a burning sensation in the eyes, blurred vision, eye irritation, dry eyes and headaches.

Contributing factors are:

- non-adjustable work stations where reading materials are too far away
- poor image quality on VDTs
- poor lighting, glare and shadows
- low humidity which causes the eyes to become dry, itchy and irritated
- uncorrected vision
- poor job design which results in long periods of close work

Preventing Vision Problems

Prevent vision problems by ensuring good conditions for viewing work tasks:

- Position work so that it is easy to see. Use adjustable chairs, well-positioned VDTs, adjustable work surfaces, and task lights.
- Use legible source documents and VDTs with good image quality.
- Encourage adequate humidity levels to prevent dry eyes.
- Ensure regular eye examinations to avoid problems of uncorrected or improperly corrected vision.
- Encourage frequent changes in body position by varying tasks and using good work/rest schedules.

Refer to Appendix B or ERGONOMIC INFOGRAM E-DO2 for further recommendations.

3. POSTURE

Prolonged and repetitive motions and excessive force cause muscle and joint problems. The parts of the body that office work most often affects are the back, arms, wrists, hands, neck and shoulders. Back problems occur when workers use poorly adjusted chairs and work stations, and spend long periods working in one position. Overuse injury is an ongoing condition caused by the wearing down or deterioration of tissues that aid the body's movement.

Contributing factors to posture problems are:

- static body positions which cause muscle tension, require energy, and reduce the flow of blood to the muscles
- repetitive motions which cause tiredness, pain and possible overuse injury
- uncorrected vision, glare or shadows which force workers to use awkward body positions to see work properly
- work stations which are too high or low and have needed objects placed too far away from workers
- improperly adjusted chairs which place pressure on the underside of the legs and impair blood circulation
- hard floors which cause feet and legs to ache if workers walk or stand for long periods

Preventing Posture Problems

The key to preventing posture problems is to avoid long periods working in one position and repeating the same motions:

- Ensure that chairs and work surfaces are adjusted properly and that there is enough space to work in a comfortable position.
- Eliminate glare by properly positioning lights and desks. Eliminate shadows by using task lamps. Adjust window curtains and blinds as conditions vary through the day.
- Vary tasks to change body position and mental activities. Good work/rest schedules help.
- Place frequently used items within easy reach. Store infrequently used items farther away.

Refer to the Appendices or ERGONOMIC INFOGRAM Set E-D for further recommendations.

4. TEMPERATURE AND HUMIDITY

Temperature, humidity, air movement, and clothing affect worker comfort. Poor temperature control and low humidity can cause chills or sweating, irritability, headaches, fatigue, dry eyes, and static electricity.

VDTs, photocopiers and other heat-emitting equipment can increase the office temperature to the point where it is uncomfortable.

Air conditioning decreases summer humidity problems. Good air circulation evens out air temperature from floor to ceiling.

Preventing Temperature and Humidity Problems

Office ventilation systems are complex and often unadjustable by the office worker. The occupational health and safety committee may need to consult building maintenance personnel. To prevent temperature and humidity problems, the committee can check that ventilation systems are well-maintained and clean. The committee can also encourage workers to:

- dress appropriately for office conditions.
- use curtains and blinds to control sunlight.
- use fans for spot cooling and to increase air flow.

Refer to Appendix C or ERGONOMIC INFOGRAM E-D03 for further recommendations.

5. NOISE

There are many sources of noise in the office. Printers, photocopiers, telephones, conversations, people moving, and outside traffic all contribute to overall noise levels.

Office work demands concentration. Noise interferes with concentration, distracts workers and makes conversations difficult. Annoying sounds increase stress levels.

Preventing Noise Problems

Try some of the following methods to reduce office noise:

- Use sound levels as one of the criteria for selecting new equipment.
- Maintain equipment properly by regularly lubricating it and tightening loose parts.
- Isolate noisy equipment by placing it in a separate room or locating it as far from workers as possible.
- Use barriers, walls or dividers. Acoustically treated materials absorb some noise.
- Use rubber pads under printers and typewriters.
- Enclose equipment with acoustical covers or noise hoods.
- Schedule noisy tasks for times when they will have the least effect on other workers.

Refer to Appendix D or ERGONOMIC INFOGRAM E-D04 for further recommendations.

6. SAFETY

Common types of office accidents occur when workers slip and fall, lift objects, puncture and cut themselves, strike against or are struck by objects, and are caught in, on, or between things.

Preventing Safety Problems

Lessen the risk of workplace injury:

- Reduce slips and falls with good flooring, well-designed stairways and proper furniture placement.
- Follow the safety rules in Appendix D for the safe use of filing cabinets.

- Follow manufacturers' instructions for the safe use of office equipment and machines.

Refer to Appendix D or ERGONOMIC INFOGRAM E-D04 for further recommendations on office safety.

7. JOB DESIGN

Increased automation has changed many office jobs. Automation has often led to jobs that require sitting or standing in one position for long periods while doing repetitive tasks. This causes health problems including muscle strain, poor blood circulation, and stress from lack of or too much mental activity.

Well-designed office jobs:

- minimize energy expenditure and force requirements
- balance tasks and provide changes in body position and mental activity
- allow some decision-making so workers can vary activities according to personal needs, work habits and circumstances in the workplace
- give workers a sense of accomplishment
- include training so workers know what tasks to do and how to do them
- provide good work/rest schedules
- provide feedback to workers about how they are doing

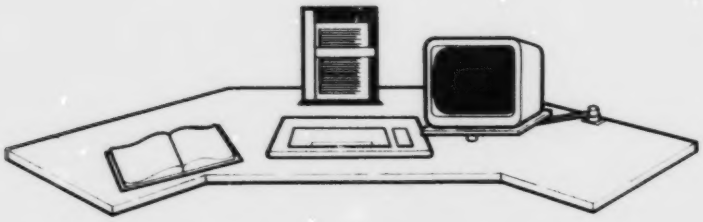
Preventing Job Design Problems

Plan jobs so they match the needs and capabilities of workers:

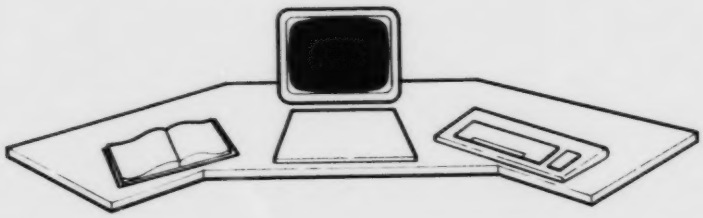
- Ensure workers take regular rest breaks. Changing the activity eases muscle aches and eyestrain. Encourage workers to stand up, move around and change mental activity during rest breaks.
- Vary work tasks. Break up VDT work with non-VDT tasks to ensure change in body position and mental activity.
- Set a reasonable work pace. Working too quickly contributes to muscle strain. Working too slowly contributes to boredom.

Use workplace design to accomplish good job design. The following example shows how the same basic workplace can be rearranged to suit different tasks.

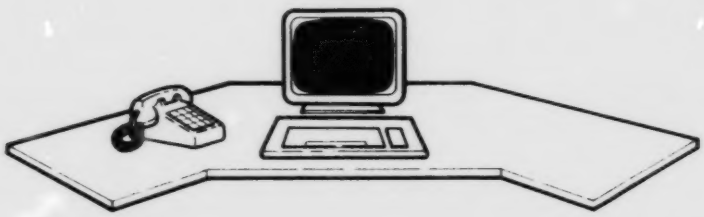
Job	Task	Description
A	Primary task:	Data entry from paper to VDT.
	Primary tools:	VDT, paper source documents, document holder, adjustable chair and work surface.
	Layout:	Line of sight is directed at source document which is placed in front of the operator. Keyboard is in front of operator but VDT screen is placed to the side. This layout assumes that the operator does not need to constantly look at the VDT screen.



B	Primary task:	Data entry from VDT and note-making on paper.
	Primary tools:	VDT, paper, adjustable chair and work surface.
	Layout:	For right-handed operators, the line of sight is at VDT screen, keyboard is to the left of operator and paper document is directly in front of the operator.



C	Primary tasks:	Data entry of customer orders taken over the telephone.
	Primary tools:	Telephone with headset, VDT, adjustable chair and work surface.
	Layout:	VDT and keyboard are in front of the operator.



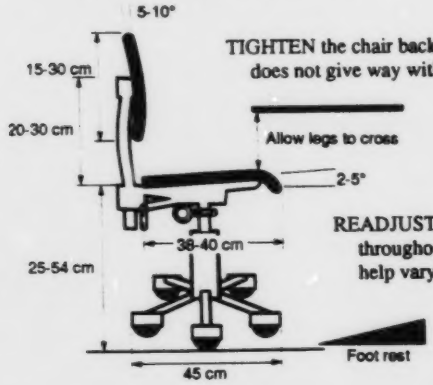
APPENDIX A

Chair and Work Surface

CHAIR

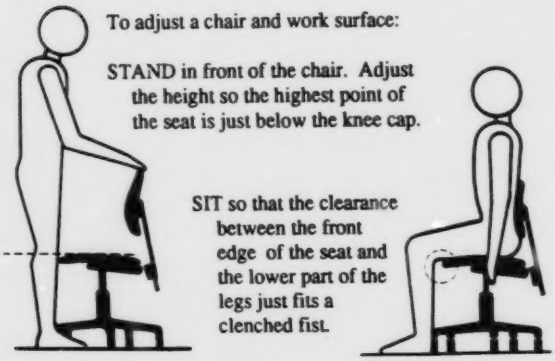
CHOOSE a chair with:

- a backrest which is shaped to support the lower back
- a seat height which does not put pressure on back of thighs or knees
- a seat that curves downwards at the front edge
- a stable base
- a swivel mechanism
- arm rests which do not prevent the chair from being drawn up to the work surface or interfere with natural movement
- breathable fabric on the seat
- controls that can be used while seated



TIGHTEN the chair backrest so that it does not give way with body weight.

READJUST the chair throughout the day to help vary body position.

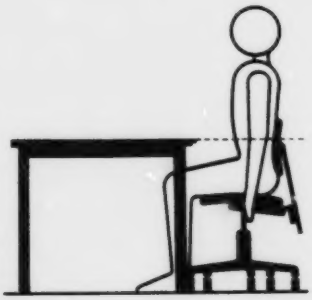


To adjust a chair and work surface:

STAND in front of the chair. Adjust the height so the highest point of the seat is just below the knee cap.

SIT so that the clearance between the front edge of the seat and the lower part of the legs just fits a clenched fist.

ADJUST the backrest of the chair so that it supports the hollow of the lower back.



ADJUST work surface to about the height of elbows with the arms hanging straight by the sides.

If using a fixed height work surface, raise the chair to get the proper arm and upper body position:

ADJUST chair height so elbows are about the same height as the work surface.

USE a footrest if the feet cannot rest flat on the floor or if there is pressure on the back of the legs. The footrest should be adjustable and support the whole foot.

WORK SURFACE

MAKE adjustments so work surface is at the correct working height.

ENSURE that work surface is large enough to hold materials.

AVOID cramping legs under work surface.

DO NOT STORE materials under work surface.

AVOID over-reaching and twisting.

STORE frequently used items in the most convenient place.

Available for display as ERGONOMIC INFOGRAM E-D01

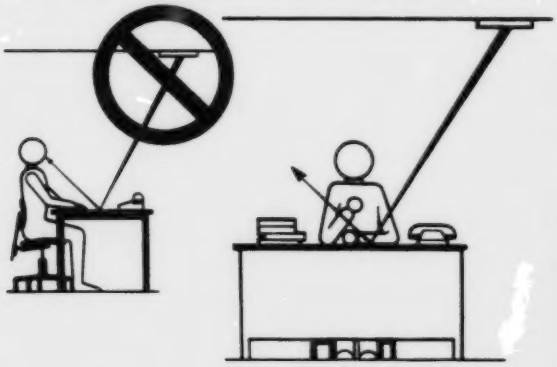
APPENDIX B

Visual Environment

IDENTIFY sources of glare. Place a mirror on the desk and look for images. Bare light bulbs or bright lights reflected in the mirror cause glare.

POSITION desk with window to the side of the worker.

POSITION desk so that ceiling lights are to the sides. Avoid placing desk where light fixtures are directly in front.

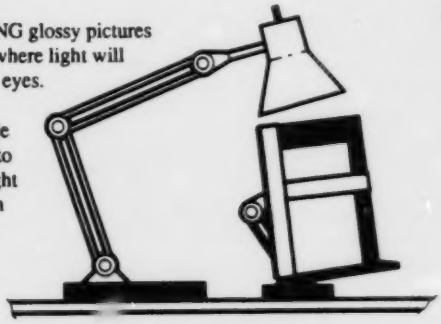


ADJUST window blinds or drapes to control light levels and glare.

USE non-glare finishes and neutral colours on walls and furniture. The colour and finish of a surface determines how much light it reflects.

DO NOT HANG glossy pictures or objects where light will reflect into eyes.

USE adjustable task lights to increase light levels when needed.



USE indirect lighting to eliminate shadows.

CHECK fluorescent lights for flicker. Replace fluorescent tubes regularly and maintain fixtures properly.

LOOK up and away from work frequently to rest the eyes.

WORK from good, clear copy. Higher light levels are required for poor copy.

ENSURE that storerooms, corridors and stairways are well lit.

Appropriate light levels depend on visual preferences and type of work. In the following chart, the higher ranges are for workers with poorer vision and for work requiring high speed or accuracy.

LOCATION	LIGHT LEVEL (LUX)
Corridors	50-150
Stairs	100-200
Coat Rooms	100-200
Stock Rooms	200-400
Traditional Office Tasks	500-750
Conference Rooms	300-750
Drawing Offices	500-1000

Check with the occupational health and safety agency or department in your jurisdiction for regulations regarding light levels.

Available for display as ERGONOMIC INFOGRAM E-D02

APPENDIX C

Thermal Conditions and Noise

TEMPERATURE AND HUMIDITY

Temperature and humidity together affect comfort.

Optimum office temperature is 20-24°C (70-75°F).

Optimum office humidity is between 30 and 60%.

Office ventilation systems are complex. Generally, building maintenance engineers maintain them.

USE portable heaters only if the proper authority approves them. Heaters are a potential fire hazard.

DO NOT USE heaters that produce toxic fumes.

USE only heaters with thermostats.

PLACE heaters or fans so that they do not blow air directly on workers.

KEEP heaters away from combustibles and curtains.

PLACE fans so that they do not vibrate and fall off surfaces.

UNPLUG heaters and fans and wait for blades to stop before moving them.

USE window curtains or blinds to increase or decrease heat from the sun.

USE reflective coating or tinting on windows to decrease heat from the sun.

CONSIDER impact on ventilation before rearranging office equipment or furniture.

WEAR clothing appropriate for the office conditions.

ENSURE that ventilation systems, dehumidifiers and humidifiers are properly cleaned and maintained.

NOISE

Office noise disturbs and distracts workers.

SELECT quiet equipment.

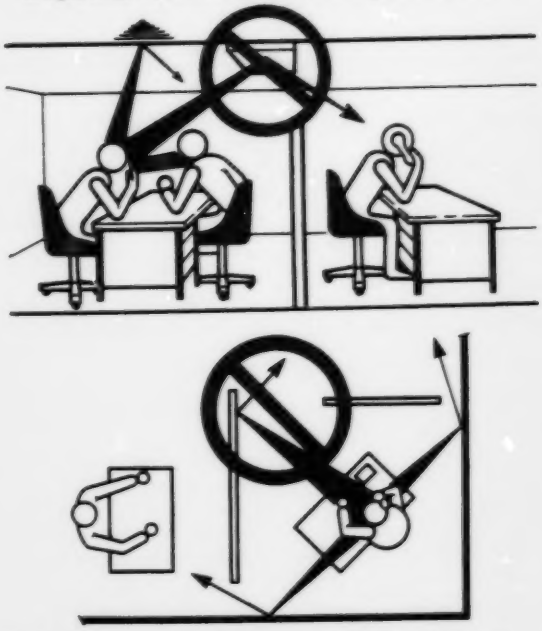
ENSURE that equipment is well maintained.

ISOLATE noisy equipment from general work areas.

USE noise hoods over noisy equipment.

USE sound-absorbing materials such as carpeting, curtains, acoustic baffles and typewriter pads.

CHOOSE and position acoustic screens carefully. The position of light fixtures, walls and desks can change noise levels.



USE conference rooms for conversations that could distract other workers.

SCHEDULE noisy tasks when they least effect others.

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APPENDIX D

Safety

Most office accidents result from slips, trips and falls, lifting objects, being caught in or between things, and punctures or cuts.

FILING CABINETS

CLOSE cabinet drawers when not in use.

DO NOT OPEN more than one drawer at a time.

PLACE cabinets so that drawers do not open into aisles.

LOAD cabinets starting from the bottom for stability.

SECURE cabinets to wall or floor.

USE handles to close drawers to avoid catching fingers.

AVOID overfilling cabinets to prevent paper and staple cuts.

DO NOT KEEP heavy objects on top of tall filing cabinets.

FLOORS AND STAIRS

CLEAN up spills and tracked-in rain or snow.

PICK objects up off the floor. Even paper, pencils and rubberbands can cause trips and falls.

USE slip-resistant preparations on linoleum, tile, or other polished floor surfaces.

SECURE carpets and rugs.

USE handrails on stairs.

REMOVE stairway distractions such as mirrors, decorations or posters.

WALK on the right.

DO NOT RUN, especially near corners.

INSTALL mirrors at blind, busy corners.

DO NOT STORE boxes, equipment or supplies outside doorways or in aisles.

DO NOT CARRY loads that obstruct vision.

DO NOT PARTICIPATE in horseplay.

OFFICE EQUIPMENT

USE fingertip guards when handling paper.

STORE pencils and pens point down or flat in drawers.

SHEATH scissors, letter openers, razor blades or other sharp tools before storing.

USE paper cutter safely:
- Keep knife blade in locked position.
- Use proper guards.
- Maintain firm grip on blade handle.
- Do not cut too many papers at once.

USE a staple remover to remove staples.

FILE sharp edges off metal furniture.

USE a proper ladder or step stool to reach high places. Do not use a box, desk or rolling chair.

OFFICE MACHINES

KEEP long hair, fingers and jewellery away from moving machinery.

USE proper guards on machines.

OBSERVE directions and cautions when adjusting machinery.

CALL service for repairs.

DISCONNECT and report frayed electrical cords or plugs.

UNPLUG equipment when not in use or before making adjustments.

FIRE SAFETY

DISPOSE of cigarette, cigar or pipe ashes properly.

USE nonflammable waste baskets.

STORE oily or solvent-soaked rags in fireproof containers.

KNOW evacuation procedures and the location of exits.

KNOW the location and classes of fire extinguishers and how to use them.

An office worker entering a plant or factory MUST wear the appropriate personal protective equipment and observe proper safety procedures.

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APPENDIX E

Exercises to do at the Work Station

Many office workers have jobs where they sit or stand for long periods. Working in one position can lead to muscle pain and strain.

Exercises done at the desk can help.

TALL STRETCH

Interlock fingers, palms up. Stretch arms above the head until they are straight. Do not arch the back.

SIDE STRETCH

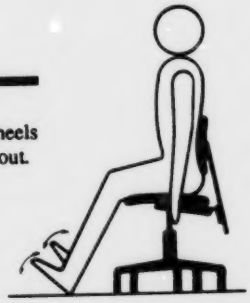
Drop left shoulder, reaching left hand towards the floor. Return to starting position. Repeat on right side.

BACK CURL

Grasp shin, lift leg off the floor. Bend forward (curling the back), reaching nose toward the knee.

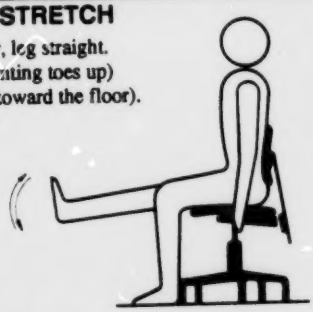
TOE-IN, TOE-OUT

Place feet shoulder-width apart, heels on the floor. Swing toes in, then out.



ANKLE FLEX AND STRETCH

Hold one foot off the floor, leg straight. Alternately flex ankle (pointing toes up) and extend (pointing toes toward the floor). Repeat with the other leg.

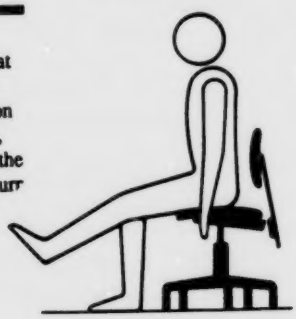


SHOULDER ROLL

Roll the shoulders--raise them, pull them back, then drop them and relax. Repeat in the opposite direction.

LEG LIFT

Sit forward on the chair so that your back is not touching the chair's back. Place feet flat on the floor. With a straight leg, lift one foot a few inches off the floor. Hold momentarily, return it to the floor and repeat with the other leg.



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